

IN THE CLAIMS

Please amend the claims as follows:

Claim 1 (Currently Amended): A method of forming a ~~metal-containing~~ film comprising HfO₂ on a substrate, the method comprising:

providing a plurality of substrates on respective surfaces of a tier substrate holder in a process chamber of a batch type processing system;

heating the substrates to a temperature of approximately 180°C, said temperature being selected to improve uniformity of processing among the plurality of substrates;

flowing a pulse of a hafnium-containing precursor in the process chamber;

flowing a pulse of a reactant gas in the process chamber; and

repeating the flowing processes until a ~~hafnium-containing film~~ film comprising HfO₂ with desired film properties is formed on the substrates.

Claims 2-3 (Canceled).

Claim 4 (Original): The method according to claim 1; further comprising flowing a purge gas in the process chamber.

Claim 5 (Original): The method according to claim 4, wherein the flowing a purge gas comprises flowing a flow rate between about 100sccm and about 10,000sccm.

Claim 6 (Original): The method according to claim 1, further comprising flowing a pulse of a purge gas in the process chamber when the metal-containing precursor and the reactant gas are not flowing.

Claim 7 (Original): The method according to claim 6, wherein the flowing a pulse of a purge gas comprises flowing a pulse duration between about 1sec to about 500sec.

Claim 8 (Previously Presented): The method according to claim 1, wherein the flowing a pulse of a hafnium-containing precursor comprises flowing a hafnium-containing precursor and a carrier gas.

Claim 9 (Original): The method according to claim 8, wherein the flowing a carrier gas comprises a flow rate between about 100sccm and about 10,000sccm.

Claim 10 (Original): The method according to claim 1, wherein the flowing a pulse of a reactant gas comprises flowing a reactant gas and a carrier gas.

Claim 11 (Original): The method according to claim 1, wherein the flowing a pulse of a reactant gas comprises flowing at least one of an oxidizing gas, a reducing gas, and an inert gas.

Claim 12 (Original): The method according to claim 11, wherein the flowing a pulse of an oxidizing gas comprises flowing an oxygen-containing gas.

Claim 13 (Original): The method according to claim 12, wherein the flowing a pulse of an oxygen-containing gas comprises flowing at least one of O₂, O₃, H₂O₂, H₂O, NO, N₂O, and NO₂.

Claims 14-19 (Canceled).

Claim 20 (Original): The method according to claim 1, wherein the providing comprises providing at least one of a semiconductor substrate, a LCD substrate, and a glass substrate.

Claim 21 (Original): The method according to claim 20, wherein the providing comprises providing a Si substrate or a compound semiconductor substrate.

Claim 22 (Original): The method according to claim 1, wherein the providing comprises providing a substrate containing an interfacial film selected from an oxide film, a nitride film, an oxynitride film, or mixtures thereof.

Claim 23 (Original): The method according to claim 1, wherein the providing comprises providing a batch of about 100 substrates or less.

Claim 24 (Original): The method according to claim 1, wherein the providing comprises providing a substrate with a substrate diameter greater than about 195 mm.

Claim 25 (Previously Presented): The method according to claim 1, wherein the flowing a pulse of a hafnium-containing precursor comprises flowing a pulse duration between about 1sec and about 500sec.

Claim 26 (Original): The method according to claim 1, wherein the flowing a pulse of a reactant gas comprises flowing a pulse duration between about 1sec and about 500sec.

Claims 27-28 (Canceled).

Claim 29 (Previously Presented): The method according to claim 1, wherein the flowing a pulse of a hafnium-containing precursor further comprises flowing a hafnium-containing precursor liquid into a vaporizer at a flow rate between about 0.05ccm and about 1ccm.

Claim 30 (Original): The method according to claim 1, wherein the flowing a pulse of a reactant gas comprises flowing a flow rate between about 100sccm and about 2,000sccm.

Claim 31 (Original): The method according to claim 1, further comprising providing a process chamber pressure less than about 10Torr.

Claim 32 (Original): The method according to claim 1, further comprising providing a process chamber pressure between about 0.05Torr and about 2Torr.

Claim 33 (Original): The method according to claim 1, further comprising providing a process chamber pressure of about 0.3Torr.

Claim 34 (Currently Amended): The method according to claim 1, wherein the repeating comprises forming a ~~hafnium-containing film with~~ a film comprising HfO₂ and having a film thickness less than about 1000Å.

Claim 35 (Currently Amended): The method according to claim 1, wherein the repeating comprises forming a ~~hafnium-containing film with~~ a film comprising HfO₂ and having a film thickness less than about 200Å.

Claim 36 (Currently Amended): The method according to claim 1, wherein the repeating comprises forming a ~~hafnium-containing film with~~ a film comprising HfO₂ and having a film thickness less than about 50Å.

Claim 37 (Currently Amended): The method according to claim 1, further comprising annealing the ~~hafnium-containing~~ film comprising HfO₂ at a temperature between about 150°C and about 1000°C.

Claim 38 (Original): The method according to claim 1, further comprising depositing an electrode film comprising at least one of W, Al, TaN, TaSiN, HfN, HfSiN, TiN, TiSiN, Re, Ru, Si, poly-Si, and SiGe.

Claims 39-51 (Canceled).

Claim 52 (Previously Presented): The method according to claim 1, wherein the heating comprises heating the plurality of substrates under isothermal heating conditions.

Claims 53-54 (Canceled).

Claim 55 (Withdrawn/Previously Presented): The method according to claim 1, wherein the flowing a pulse of hafnium-containing precursor comprises flowing a hafnium alkoxide.

Claim 56 (Withdrawn/Previously Presented): The method according to claim 55, wherein the flowing a hafnium alkoxide comprises flowing $\text{Hf}(\text{OBut})_4$.

Claims 57-58 (Canceled).

Claim 59 (Previously Presented): The method according to claim 1, wherein the flowing a pulse of hafnium-containing precursor comprises flowing a hafnium alkylamide.

Claim 60 (Previously Presented): The method according to claim 59, wherein the flowing a hafnium alkylamide comprises flowing at least one of $\text{Hf}(\text{NEt}_2)_4$, $\text{Hf}(\text{NEtMe})_4$, or a combination thereof.

Claim 61 (Previously Presented): The method according to claim 1, wherein:
the repeating comprises forming an HfO_2 film on each of the plurality of substrates, each film having a thickness of about 30A to about 50A and a WIW uniformity of about 10% to about 15%.

Claim 62 (Previously Presented): The method according to claim 1, wherein:
the repeating comprises forming an HfO_2 film on each of the plurality of substrates, each film having a thickness of about 20A to about 50A and a WIW uniformity of about 20% or less.

Claims 63-64 (Canceled).

Claim 65 (Withdrawn): A computer readable medium containing program instructions for execution on a processor, which when executed by the processor, cause a batch substrate processing apparatus to perform the steps in the method recited in claim 1.

Claims 66-77 (Canceled).

Claim 78 (Currently Amended): The method of Claim 1, wherein said flowing steps provide a deposition rate of about 1 angstrom ~~[[per]]~~ for each cycle of flowing a pulse at a hafnium-containing precursor and flowing a pulse of reactant gas.

Claim 79 (Currently Amended): A method of forming a ~~metal-containing~~ film comprising HfO₂ on a substrate, the method comprising:

providing a plurality of substrates on respective surfaces of a tier substrate holder in a process chamber of a batch type processing system;

heating the substrates;

flowing a pulse of hafnium-containing precursor in the process chamber; and

flowing a pulse of a reactant gas in the process chamber, wherein a total time of a cycle of flowing a pulse of hafnium-containing precursor and flowing pulse of reactant gas in the process chamber is less than 30 seconds and is repeated less than 20 times, wherein the time of a cycle and repeat amount is selected such that a film comprising HfO₂ with desired film properties is formed on the substrates with improved uniformity among the plurality of substrates.

Claim 80 (Previously Presented): The method of claim 79, wherein said heating comprises heating the substrates to approximately 200°C at a chamber pressure of approximately .3 Torr.

Claim 81 (Currently Amended): A method of forming a ~~metal-containing~~ film comprising HfO₂ on a substrate, the method comprising:

providing a plurality of substrates on respective surfaces of a tier substrate holder in a process chamber of a batch type processing system, said substrates being placed only from a middle surface to a lower surface of the tier substrate holder so that a film comprising HfO₂ with desired film properties can be formed on the substrates with improved uniformity among the plurality of substrates;

heating the substrates;

flowing a pulse of a hafnium-containing precursor in the process chamber;

flowing a pulse of a reactant gas in the process chamber; and

repeating the flowing process until a metal containing film with the desired film properties is formed on the substrates.

Claim 82 (Previously Presented): The method of claim 81, wherein said providing comprises providing the plurality of substrates on a bottom 50 respective surfaces of a 100 substrate capacity tier substrate holder.